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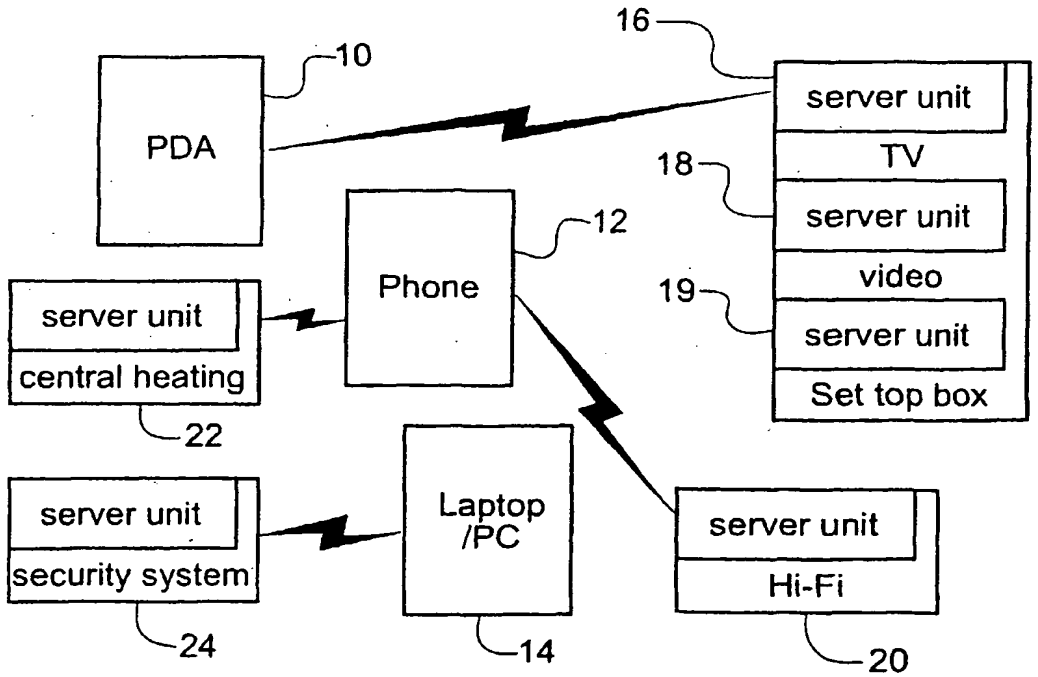
(54) Title: A DATA INTERFACE SYSTEM



(57) Abstract: A data interface system allows interface between a user via a user device (12, 14) and a host device (14, 16, 18, 20, 22) including a server unit (82) allowing control of any unit including an appropriate embedded server unit.

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A DATA INTERFACE SYSTEM

The invention relates to a data interface system, in particular allowing interface between a user via a user device, and a host device including a server unit. The invention further relates to a server unit for such a system and a method of interfacing between a user and a host device.

Various known user interfaces are known including the ubiquitous remote control. According to such systems a dedicated remote control is associated with a given consumer device such as a television. The user presses buttons on the remote control to display options on the television screen allowing a selection of options to change the channel, adjust the volume and so forth. Of course the remote control can only be used with a dedicated television set as a result of which a large number of remote controls are commonly needed for control of a range of devices. Even where the remote control can be used for more than one device, there is still highly restricted interchangeability and a very narrow range of devices controllable by the remote control.

US 4,841,562 to Lem allows control of an existing video cassette recorder by telephone over standard phone lines, using "touch tone" signals. Although this increases the range of options available in relation to the remote control, communication between a pair of dedicated devices is still a requisite.

It is an object of the invention to overcome or mitigate disadvantages of the prior art.

The invention is set out in the appended claims. As a result a system is introduced in which a common interface programming language can be used for all host devices carrying a server unit allowing control of any unit including an appropriate embedded server unit. Furthermore the communication system can be carried out independently of external devices or systems such as the internet.

Embodiments of the invention will now be described, by way of example, with reference to the drawings, of which:-

Fig. 1 shows the system embodied in the present invention;

Fig. 2 shows a block diagram illustrating a first embodiment of the present invention;

Fig. 3 is a schematic view of operation of the present invention;

Fig. 4 shows interface screens associated with the present invention;

Fig. 5 is a flow diagram illustrating the present invention;

Fig. 6 is a further block diagram showing aspects of the present invention;

Figs 7 to 17 show further alternative embodiments of the present invention.

Fig. 1 shows some of the basic details of a system embodying the present invention. One or more host devices H1 to Hn are provided comprising, for example, consumer devices such as television, video, hi-fi/sound system, set-top box, refrigerator, heating system, air conditioning system, radio, blinds, oven, navigation or other suitable consumer device, or other devices with which the user may interact such as a parking meter, vehicle body, car toll point or control system and so forth. Each host device H1 to Hn may host one or more respective server units S1 to Sn. Each user carries a respective user device W1 to Wn for example a portable user device. Each user device can act as a browser communicating with each host device by means of an interface supported by the respective server unit such that the browser is specific to the server software, not the host application function. Various means of communication are contemplated as represented by the communication layer designated N in Fig. 1.

The or each server unit S1 to Sn in the host device H1 to Hn comprises a

standard user interface server embedded into the host device. The server unit is programmed with a user interface specific to the host device. The user interface programming language is common to all devices using the standard user interface server.

The user interface is carried out via the user device comprising a controlling device capable of displaying a user interface transmitted from the host device server unit. The user device thus acts as a user interface browser linked with the host device. The browser is used to control the host device by interaction with the host device server unit. In particular the user device sends signals to the host device once again via the communication path. Specific embodiments of the arrangement will be discussed in more detail below but in one preferred embodiment the server unit can maintain user interface pages for display on the user device. As a result the system allows a user carrying a user device to control any host device, for example an electronic device, carrying a compatible server unit, the communication link being compatible and consistent in each case and the user interface program being stored in the server unit embedded in the host device. Information exchange is carried out in a unified format so that host application specific software is not required in the user device. The server unit supports a local information exchange between the host device and the user device. The information domain supported by the server unit can be restricted to reduce processing and memory requirements to the applications relevant to the host, as programmed into the server unit. However the server unit may include a range of applications for a range of hosts which can be selected dependent on the host in which it is embedded. Significantly the system allows information exchange to be limited to the two devices, the user device and host device, involved in the information exchange with no requirement for additional programming or configuration or accessing of

external devices, systems or networks, for example the Internet, or wider telecommunication or telephone networks.

Fig. 2 shows in more detail embodiments of the invention used in a domestic context where the user units are fitted in consumer electronics equipment in the home. In the arrangement shown there are a plurality of user devices comprising a personal digital assistant (PDA) 10, a phone, for example a mobile phone (cellphone) 12 and a lap-top or PC or other computer 14. It will be appreciated that all of the capabilities discussed below can be embodied in just one of these user devices, that the capabilities can be shared amongst them differently or that even more additional user devices can be involved. The user devices communicate with a range of domestic devices which are shown in the figure as, but not limited to, a television 16, a video 18, a hi-fi or stereo 20, a central heating unit 22, and a security system 14. Each of these devices comprises a host device and a server unit is embedded in each of the host devices. As a result, for example, if it is desired to control the television the PDA 10 is activated to send out a polling signal. The devices include a server unit configured to interface with the PDA 10 using a common communication protocol issue a response signal carrying user interface data for example in the form of user interface pages. The user then selects the desired options, steps and programs by manipulating the user interface pages in the appropriate manner and controls operation of the respective host devices accordingly. For example in Fig. 2 the PDA 10 communicates with the server units embedded in the television 16, the video 18 and the set-top box 19. In a similar manner if the mobile phone 12 is activated it will communicate with the server unit for the stereo or hi-fi 20 and the central heating unit 22 server unit whilst the lap-top or PC 14 will interface with the security system server unit 24.

Because the information domain for each server unit relates to the

relevant applications for the host device access to additional information, for example from the internet, is not required. On the other hand a given user device, for example the PDA 10, can communicate with more than one host device whilst still remaining independent of any external network.

Figs. 3 and 4 show components of the system and a user interface relevant with the system. In the embodiment shown, the user carries a mobile phone (cellphone) 30 arranged to communicate with server units in each of a television 32, a set-top box 34, a stereo 36 and a video 38. Fig. 4 shows sample screens showing the potential selection option for the user on the display on the mobile phone 30. For example on the first screen 50 the user can select between the various host devices by scrolling through the options "video", "satellite", "television", and "stereo" and selecting the desired device for example by pressing a validating key in a known manner. Assuming that the user selects "television" the next screen on the display on the mobile phone is shown at 52. There are of course many options that could be shown and here, purely by way of example, the options shown are select channel, select on/off, and select volume. Again the user selects the relevant option, in this example, select channel, and is directed to the screen shown at 54 in which the user can select between channel up and channel down. It will be appreciated that any other control parameters and mechanisms and interfaces can be introduced as will be readily apparent to the skilled person. The various option screens can be stored as pages in each of the server units and the interface program stored in each server unit can further be modified to take into account the presence of other polled server units such that an initial interface screen is such as that shown at 50 in Fig. 4 giving an initial selection between available host devices.

Referring to Fig. 5 a flow chart mirroring the various option screens of Fig. 4 is shown. At step 60 the user activates the interface for example by

pressing a designated button or selecting a designated option from a menu on the user device display. At 62 the device issues a polling signal to establish server units in range or available depending on the communication system used. At step 64 the user device receives response signals from server units in range together with interface instructions for a first page. Where there are more than one server unit, as in the present example, the user interface instructions from one or more server units can include instructions to the user device to poll for an appropriate interface page to allow an initial selection from the host devices available. At step 66 the user device displays the first interface page. At step 68 the user selection is communicated to the server unit which selects and returns to the user device the relevant next interface page. This process is repeated (step 72) until a final instruction is sent to the server unit on which it acts after which the system can return either to step 60 (in which case a further interface command is required) or step 66 depending on the user interface program.

In the preferred embodiment the user device and server unit communicate by wireless communication although a wired connection is also possible. A wireless link between the server and interface browser could be GSM, BlueTooth, infrared, IrDA, 802.11a,b or any other digital radio technology. For a wired connection the link could be ethernet, RS-232, firewire or any other wire linked technology. Yet further communications technologies could be GPRS, WCDMA. Standard user interface language can be adopted for example HTML, XML, WAP, WAP2, iMode, Flash, cHTML all supported on an interface browser of the type discussed above which could be, for example, a GSM phone, a PDA, a PC, palm top, dedicated universal controller or any other device with an appropriate browser supporting the interface language used. It will be apparent to the skilled person that these

options can be interchanged and adopted using standard techniques which will be well known. In the most preferred embodiment, the server unit is a wireless access protocol (WAP) server and the user devices are WAP compatible, and communication is carried out on BlueTooth.

Turning now to Fig. 6 the basic elements of the server unit using the preferred system of WAP communication using BlueTooth technology, the user device 80 acting as a WAP browser, for example a mobile phone, PDA, lap-top, PC or dedicated device communicates with the server unit 82 over the wireless link. The server unit 82 includes the following modules:-

a BlueTooth communication module 84 (which can of course be arranged to support any other predetermined communication protocol);

a WAP server 86 defining the interface for communication to the WAP browser 80;

supported within the WAP server, optionally, WAP user interface pages 88; and

an interface 90 to the host device itself.

The host device 92 can comprise one of any range of devices as discussed above including a television, a video, a stereo or a set-top box.

Accordingly the BlueTooth module forms an interface to the communication technology, the WAP server provides the software that maintains the information exchange and information about the user interfaces that are presented on the user device in the form of the WAP user interface pages. The interface to the existing device provides an interface to the host application.

Preferably the WAP server is hosted on a smart card reader or on a system that hosts a smart card reader, for example a set-top box or PC. The applications run by the WAP server may also be resident on the smart card

reader or the system that hosts the smart card reader. Accordingly the WAP server itself is hosted on a smart card and the applications run by it may also be resident on that smart card in the alternative.

In the embodiments discussed so far it can be seen that, for example, a mobile phone with BlueTooth and a WAP interface can be used to control for example television, video, stereo and satellite receiver or set-top box each of which have an embedded WAP server with their user controls defined as WAP pages and with the WAP server linked to a BlueTooth interface. However it will be appreciated that the invention can be used in a wide range of local or short range network applications. For example, as discussed in more detail below, devices other than consumer devices such as parking meters or bodies of vehicles can have an embedded WAP server which means that the user device can communicate with the host device using the same technology. For example with a parking meter information concerning available time or rates can be accessed whereas in the vehicle body travel details, time of arrival and so forth can be accessed. The invention thus allows the user, carrying a single device if desired, to interface with any host device in which a WAP server is embedded using existing communications, protocols and technology and hence extending the capabilities both of the user device and the host device accordingly.

In one further preferred embodiment shown in Fig. 7 within a shop or store a number of server units 100 are fixed into the roof around the store. All server units are linked to the shop LAN (local area network) and connected to the store's product data base server 102. The server units 100 can be further linked to other store servers, for example, a loyalty card server (not shown). The user's Phone/PDA 104/106 makes a local connection to the nearest server unit 100. An authentication takes place to identify the user, and where appropriate access their loyalty card records. As the user walks round the store

their location can be determined from the server unit they have made connection with and hence it is known what products are in their vicinity. The server unit 100 can then send targeted advertising based on shopping habits stored in loyalty card rewards, for example and the location of the goods to be advertised. The user can also ask via the user interface supported by the server unit 100 where a product can be found and would then be directed to that product. As a further alternative the user device could be integrated with a shopping trolley as shown at 106.

In one embodiment shown in Fig. 8 the server unit 110 is a mini Wireless Access Protocol server and is resident on a smart card 112. The smart card 112 is inserted in a smart card reader that has wireless capability, for example using the Bluetooth technology, and therefore can communicate with a cellular phone PDA 116 or PC 118 that has Bluetooth capability and is also WAP compliant. Of course the reader 112 can communicate with another user device, and any appropriate means of communication.

The user is now able to read the information from the smart card in a standardised (WAP) way without the need for the cellular phone 114 or other user device to have special software related to the smart card 112. The user can also use the phone 114 to control the smart card 112 to pay for goods from vending machines 120 fitted with a server unit 110, parking meters 122, toll bridge/road meters 124 or cash machines 126 to put money on the card. The user device becomes the screen and keyboard to control the transaction of electronic money from the card to the merchant.

Referring now to Fig. 9 a WAP script is downloaded to a mobile phone 130 from server unit 132 in a vending machine 134. The script is a software version of the electronic smart card. This allows the phone 134 to connect to Internet micro payment systems and credit the phone with money. The phone

can then be used to pay for items or services by connecting the phone to the vending or other machine and using the phone to instruct the machine what payment is to be made. The balance of money left on the phone and the transfer of money to and from the phone is also controlled by the phone.

In the embodiment of Fig. 10 the server unit 140 resides in an aeroplane and interfaces with the aircraft information system gate 142 and could possibly be part of the overall information system of the plane. Using wireless technology, such as Bluetooth, or any other appropriate link the information can be streamed to the user device 144 such as cellular phones that are Bluetooth enabled and have a WAP interface. The user can access the applications in the aircraft this way in a standardised way without needing special software in the cellular phone.

Referring to Fig. 11 many existing devices in the home use infrared remote controls. In this situation a IR bridge unit is required. This is a universal remote control connected to a server unit 152 . The user interface for every IR responsive device is programmed into the server unit 152 and the IR signal to control every make of, for example, TV 154, Video 156, Set top box 158 and Hi Fi 160 is programmed in. The unit 150 is mounted in the room such that all the devices to be controlled are within the range of the IR transmitter. The phone 162 or other user device 164 can now talk to the IR bridge unit 150 using WAP and that will translate the WAP command in to IR control signals for the various household devices.

Referring to Fig 18 many existing devices already in production can be upgraded by simply inserting a server unit that has an IR control interface added. The unit will be mounted inside the existing device in such a way that the IR sensor of the device is in range and view of the IR emitter on the server

unit. The server unit is programmed with the WAP pages for that device. This allows devices already in production to be fitted with server units either on the production line, or retro fitted to devices already manufactured. The only connection between the device and the server unit is an electrical power source that can be taken from within the existing device.

Referring to Fig. 12 a parking meter 170 has a WAP server 172 with Bluetooth link that allows the user to pay for parking either by using the Smart Card as discussed in relation to Fig. 8 or by using cash or credit card. The user can then load the current time the parking expires into the user device 174 as a WAP script via the user interface supported on the service unit 172 that will cause the phone 174 to ring or otherwise signal when there is a set amount of time left on the meter 170. It can also load the parking meter ID into the phone 174 as well. The amount of time remaining will be displayed on the phone 174 through the parking period along with the ID of the machine that payment was made. This can help the user locate his car when returning to the car park as each meter can be provided with a highly visible ID display.

Referring to Fig. 13 all equipment 178 in a gym can be fitted with a WAP server 180 and Bluetooth link / contact cradle or IR link which allows WAP phone 182 when you use each of the equipment. The equipment can then inform the user device 182 via the user interface about the number of cycles, weight, time etc of the work out. This information is stored in the user device 182 as a WAP script and can be downloaded to a PC 184 with either a Bluetooth interface / contact cradle or IR link. A software program can print a report of the workout by printer 186, together with, for example previous reports and graph of progress.

Referring to Fig. 14 as the user passes through an electronic toll 190 carrying a server unit 191, that debits a smart card 192 including a server unit

193 as discussed above, the smart card 192 informs the user device 194 of the payment to the toll booth payment management system 196 by appropriate signalling. As a result a user interface on the smart card is not required.

Referring to Fig. 15 a WAP device server unit 200 acts as the interface to a home/office security system 202. The Bluetooth protocol can authenticate the WAP device 200 and then ask for personal identification of the user by the WAP device.

Turning to Fig. 16 in an airport a number of server units 210 which contain WAP pages of location information are provided for communication access, for example suspended from the roof. The server units 210 interface with the airport information system 214 linked to the car port information system server 216. The user device 212 communicates by a tight IR beam with the IR in the roof server 210 which will therefore send information only to the user device 212 that is pointing directly at it. For example where the user wants Terminal 3, Virgin Atlantic, the user device is pointed in any direction until a WAP page from a server unit 210 is displayed. Using the user interface the user selects the entry Terminal 3, Virgin. WAP script now stores the desired destination in the user device. The user device will then tell the user which way to point next to connect to the next server unit 210 in the desired direction for example by displaying an ID code visible on the suspended units. On connection to the new server, the WAP scrip will inform the new server unit 210 where the user wants to go, and the new WAP server 210 will send a direction for the next server 210 and so forth.

It is easy to get lost in current airports as they only give you key places on the signs because of size constraints. This system allows personalised navigation to the user's required destination. If the user goes the wrong way, the next WAP server 210 would advise the user accordingly.

In a preferred embodiment the system is expanded by connecting all the servers 210 into an intranet so that updated flight and other information could also be downloaded to the user device at the same time.

In the arrangement shown in Fig. 17 one or more server units 220 are fitted into a car. These report information from respective host devices including car navigation system 222, car entertainment system 224, security system 226, climate control 228, engine management 230 and service management 232 such as the car's service status, e.g. how may more miles to the next service and cause the user device 234 to signal if service is due. The car can communicate mileage and movement using the navigation system 222 so that the user can download these detail to help complete company mileage expenses claims. The car entertainment system 224 can be controlled by any phone 234, so users in the back of the car can adjust the volume, track, station. The climate control can be operated, doors unlocked and other controls effected in the same manner.

It will be noted that in this embodiment, as will all the embodiments, a server unit can interface with more than one user device and/or more than one server device.

It will be appreciated that in addition to the specific embodiments discussed above any appropriate user device or host device may incorporate the relevant technology, and any appropriate communications protocol and user interface can be adopted.

CLAIMS

1. A data interface system comprising a user device and at least one host device, each host device having a server unit embedded thereon supporting a user interface for display at the user device.

2. A data interface system as claimed in claim 1 in which the user device comprises one of a mobile/cellphone, a PDA, a PC, a palm-top, a lap-top or a dedicated universal controller.

3. A data interface system as claimed in claim 1 or claim 2 in which the host device comprises one of a television, a video, a stereo, a set-top box, a satellite receiver, a refrigerator, a heating unit, an air conditioning unit, a radio, blinds, a cooker, navigation equipment, a parking meter, a toll booth, a gymnastic device, or a vehicle body, or operating or information system.

4. A data interface system as claimed in any preceding claim in which the user device comprises an interface browser for the user interface supported by the server unit.

5. A data interface system as claimed in any preceding claim in which the user device comprises a display for displaying the user interface.

6. A data interface system as claimed in any preceding claim in which the server unit is configured for the host device.

7. A data interface system as claimed in claim 6 in which the server unit

includes an interface to the host device, an interface to the communications technology and said user interface.

8. A data interface system as claimed in any preceding claim in which the user interface comprises one or more user interface pages.

9. A data interface system as claimed in any preceding claim in which the host device includes a smart card reader and the server unit comprises a smart card.

10. A data interface system as claimed in any preceding claim in which the interface between user device and host device comprises wireless communication.

11. A data interface system as claimed in claim 10 in which the wireless communication means comprises one of BlueTooth, GSM, infrared, 802.11 or digital radio communication.

12. A data interface system as claimed in any of claims 1 to 9 in which the interface between the user device and the host device comprises wired communication.

13. A data interface system as claimed in claim 12 in which the communication means is one of Ethernet, RS-232, Firewire.

14. A data interface system as claimed in any preceding claim in which the interface language is one of HTML, XML, WAP, WAP2, iMode, cHTML,

Flash.

15. A data interface system as claimed in any preceding claim in which a server unit is embedded common to a plurality of host devices.

16. A data interface system as claimed in any preceding claim in which the user device further communicates with an external network.

17. A data interface system as claimed in any preceding claim in which the host device further communicates with one or more dedicated devices, for example domestic devices.

18. A data interface system as claimed in claim 9 in which the smart card interfaces with a dedicated device.

19. A data interface system comprising a user device and a host device including an embedded WAP server supporting a user interface and arranged to communicate the interface to the user device via BlueTooth.

20. A data interface system as claimed in any preceding claim in which the server unit is supported on a smart card.

21. A server unit for a data interface system as claimed in any preceding claim, the server unit being arranged to be embedded in a host device and including an interface to the host device, an interface to a remote user device and means for supporting a user interface between the user device and the host device.

22. A method of controlling an interface between a user having a user device, and a host device including an embedded server unit, in which the user device polls the host device server unit, the server unit communicates a user interface to the user device, and the user device communicates the user selection to the server unit which interfaces with the host device to enable the user selection.

23. A method as claimed in claim 22 in which the user device polls a plurality of host devices each including an embedded server unit, one or more of the server units communicating an initial user interface for the user to select which of the host devices to interface with.

24. A data interface system, server unit and method as claimed in any preceding claim and substantially as illustrated by the figures.

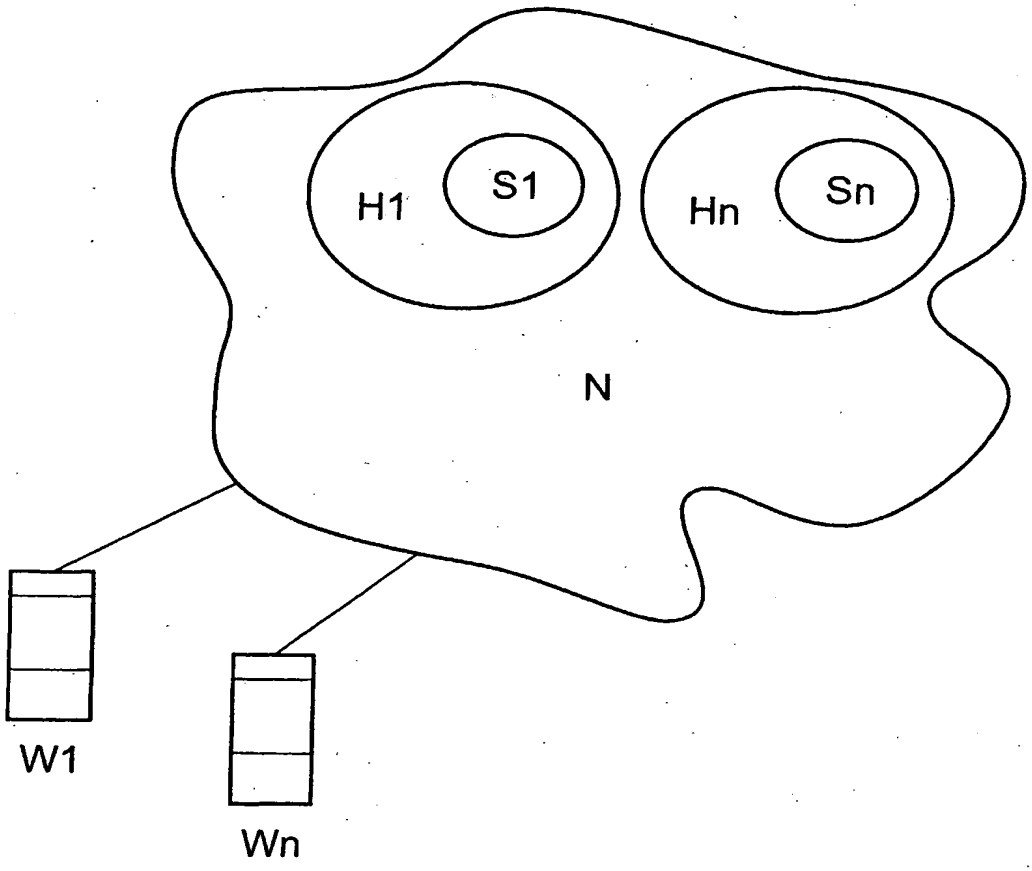

Fig. 1

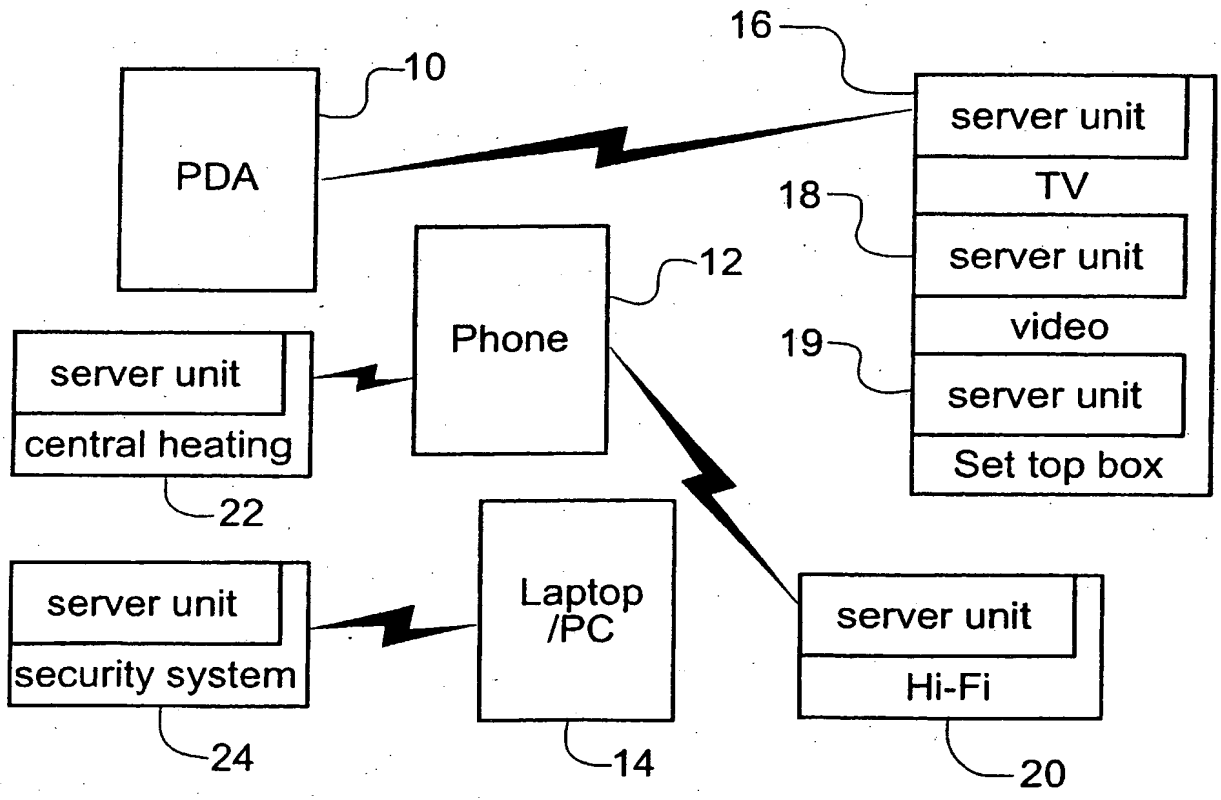
16
10
PDA
server unit
TV
18
server unit
12
Phone
video
19
server unit
server unit
central heating
Set top box
22
server unit
Laptop
/PC
server unit
security system
Hi-Fi
24
14
20

Fig. 2

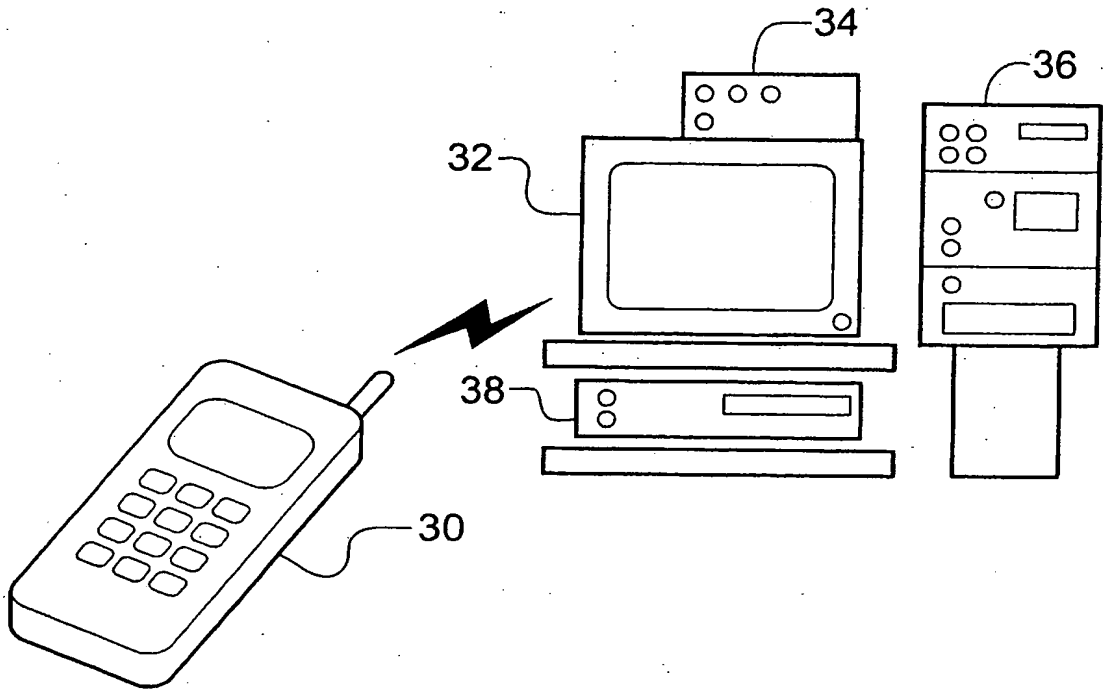

Fig. 3

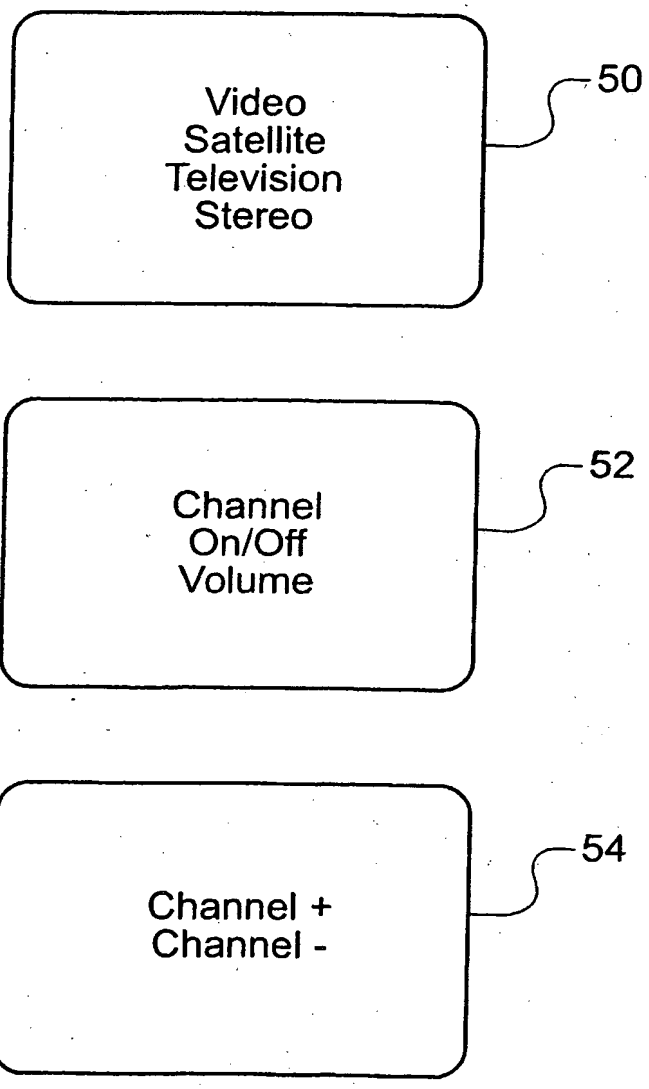
Video
Satellite
Television
Stereo
50
Channel
On/Off
Volume
52
Channel +
Channel -
54

Fig. 4

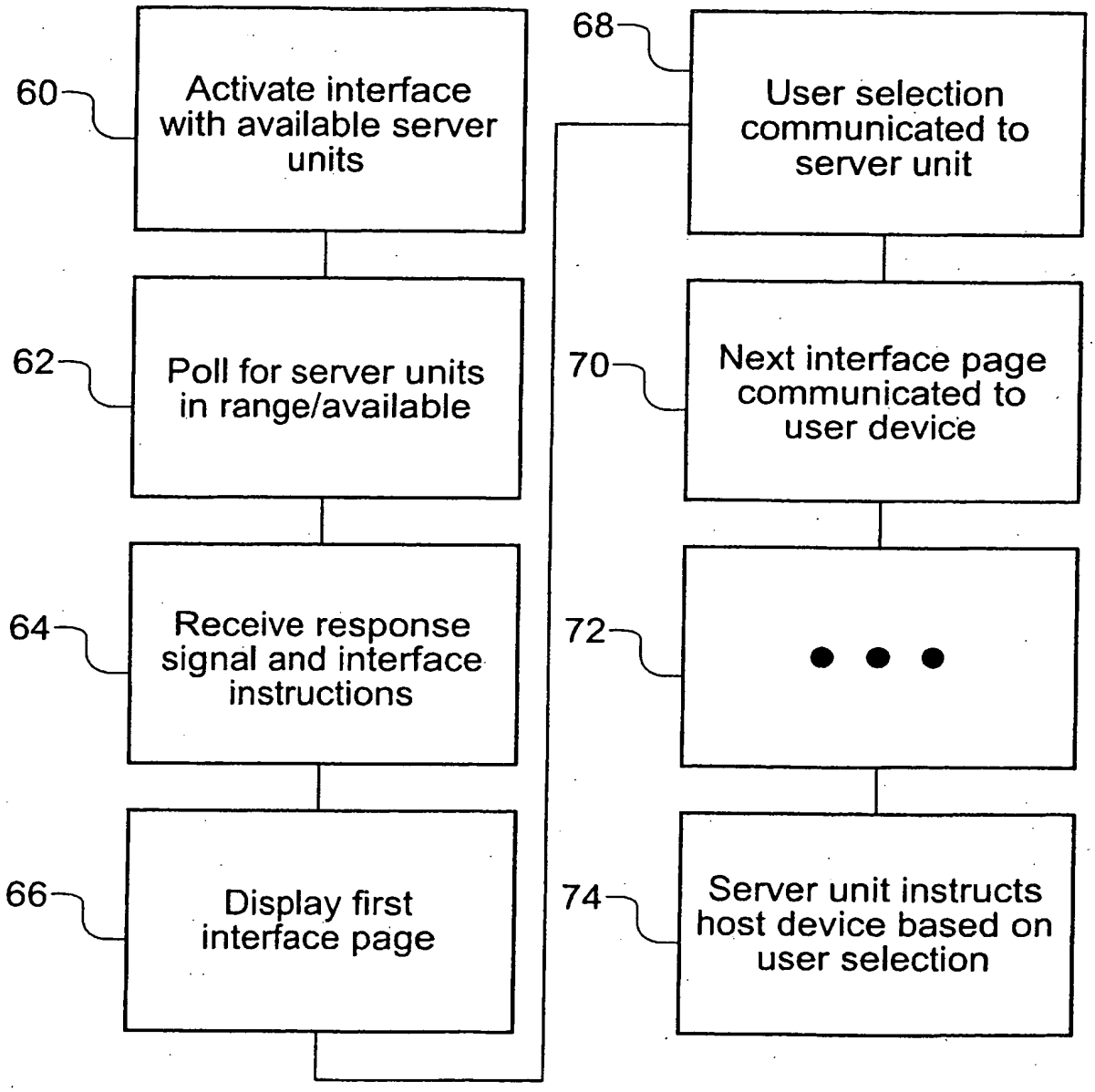

Fig. 5

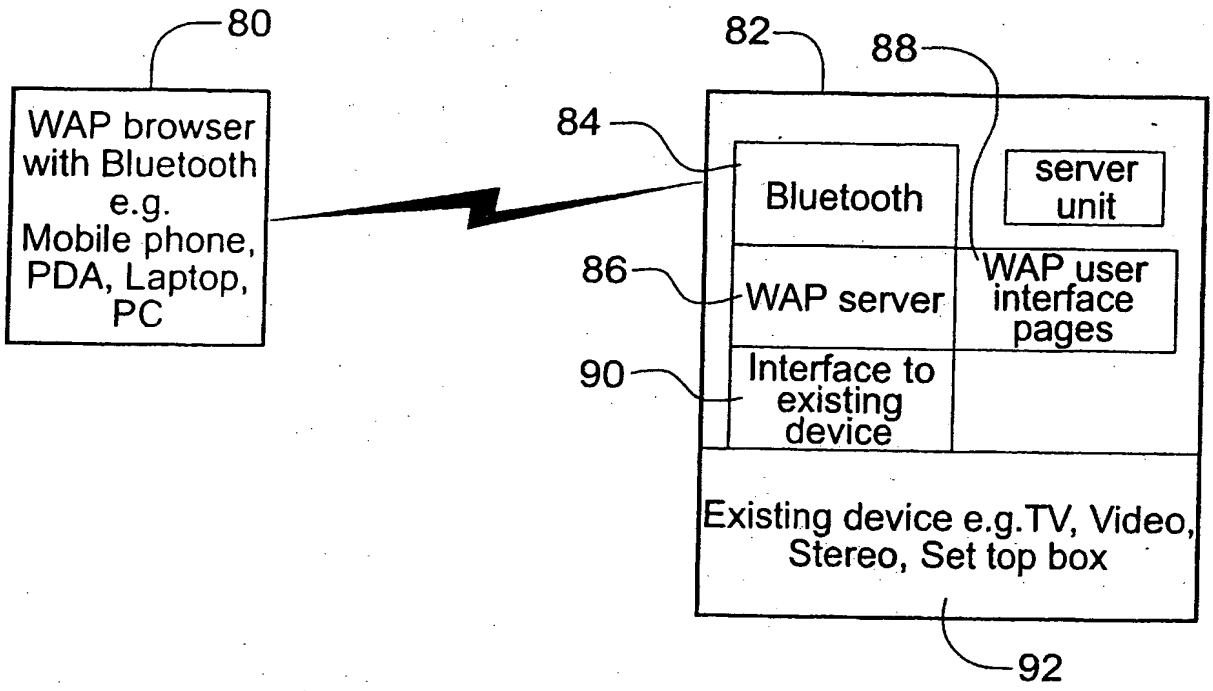
80
WAP browser with Bluetooth e.g. Mobile phone, PDA, Laptop, PC
82
88
84
Bluetooth
server unit
86
WAP server
WAP user interface pages
90
Interface to existing device
Existing device e.g.TV, Video, Stereo, Set top box
92

Fig. 6

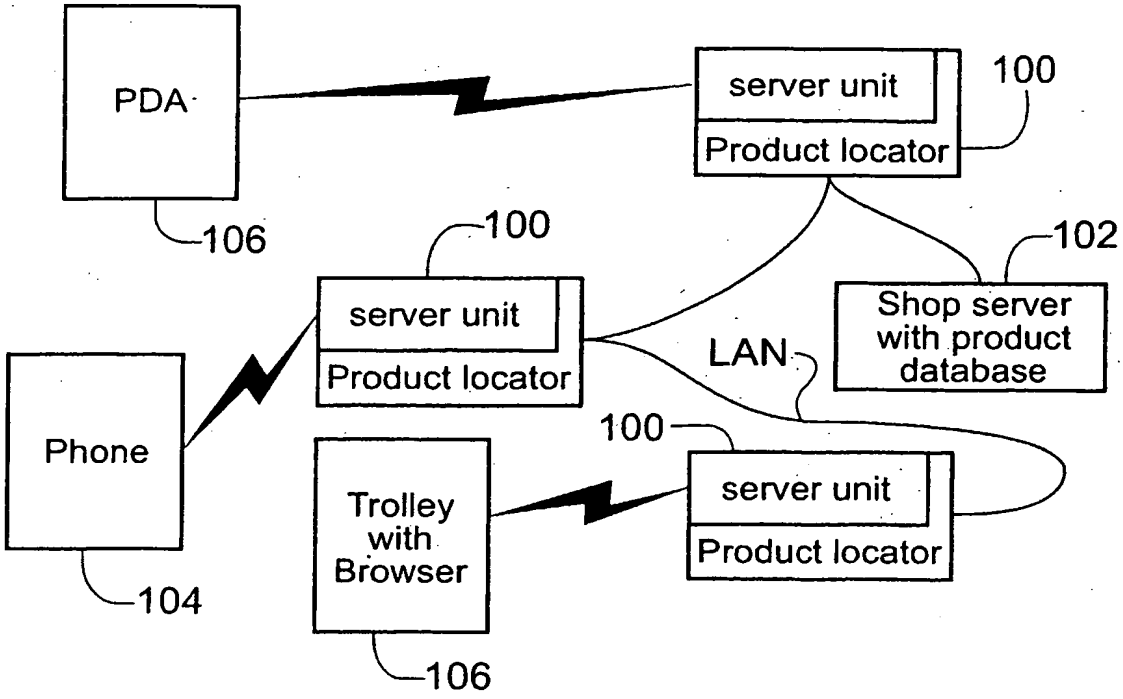

Fig. 7

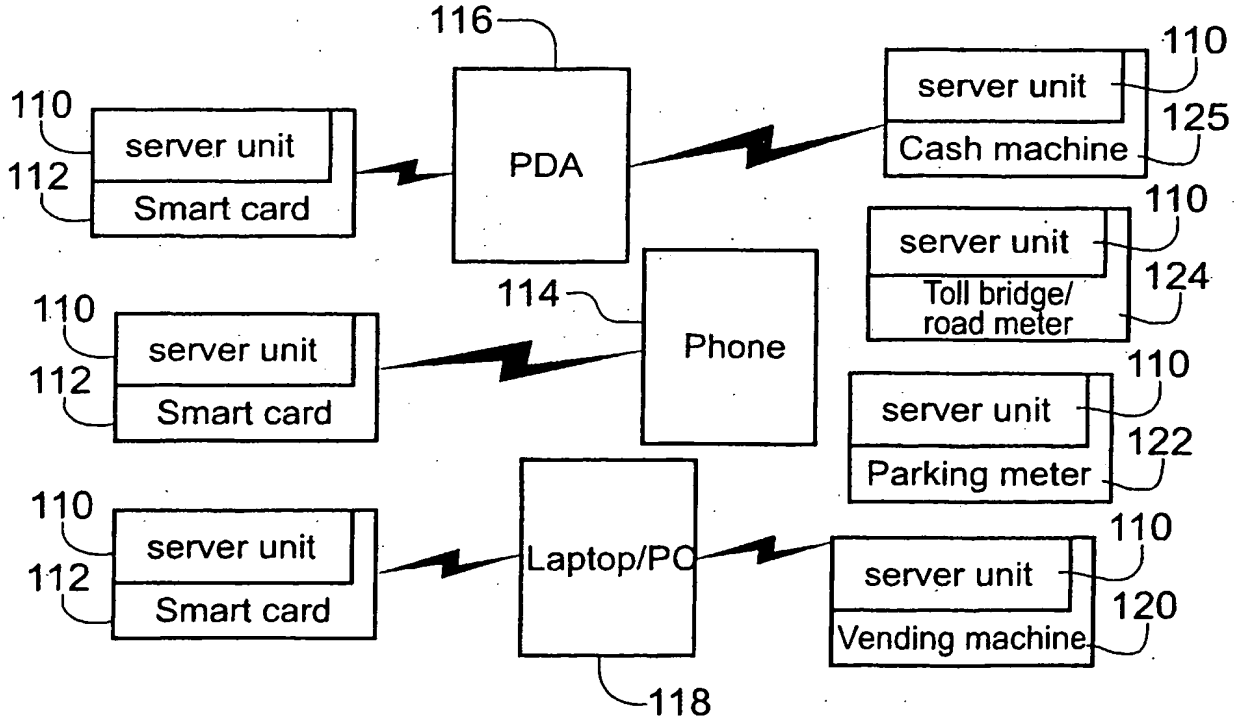

Fig. 8

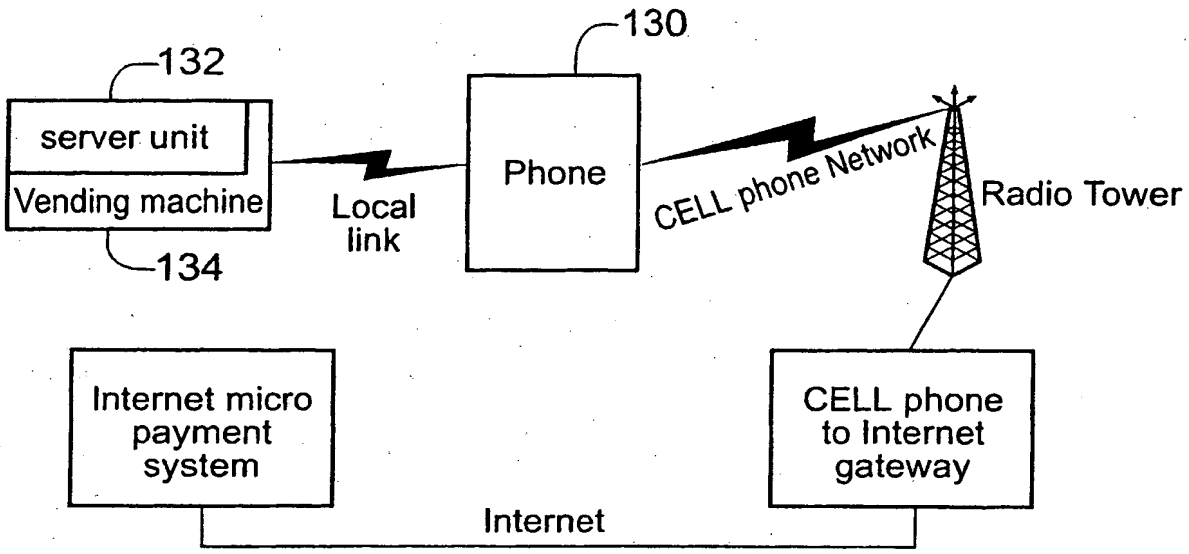

Fig. 9

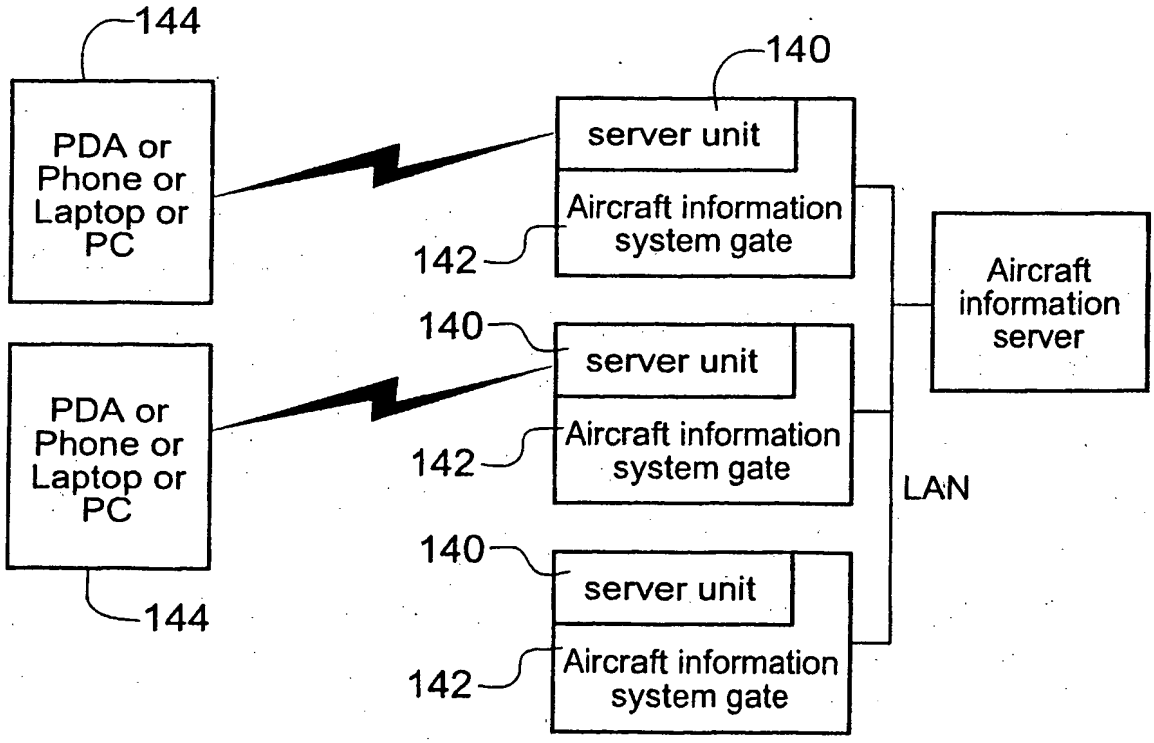

Fig. 10

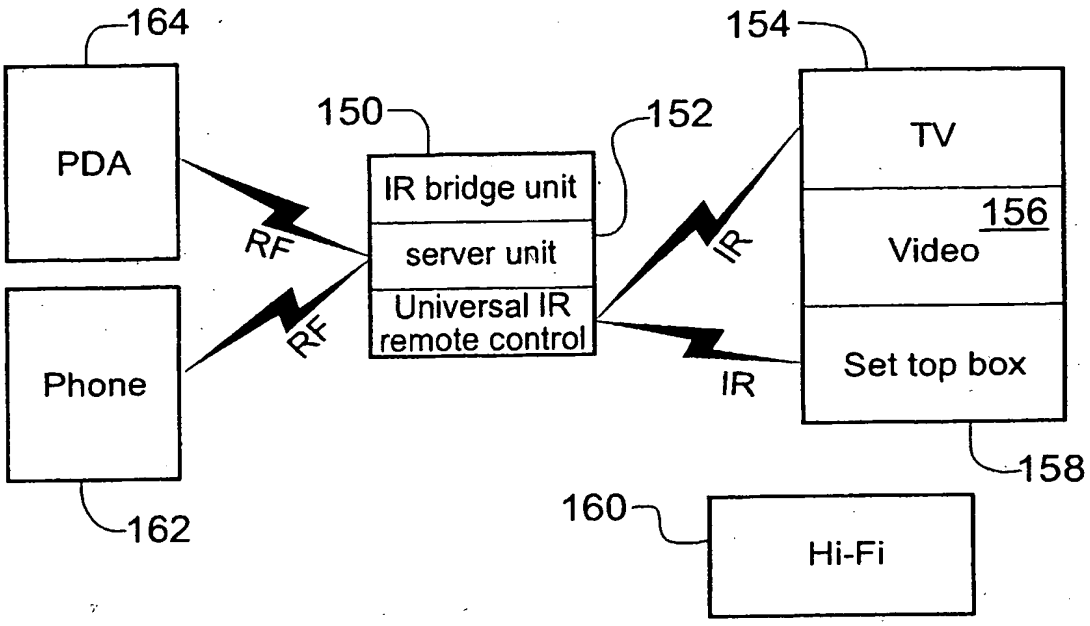

Fig. 11

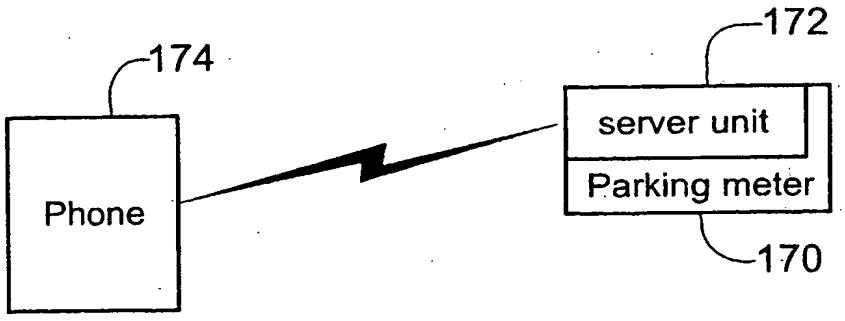

Fig. 12

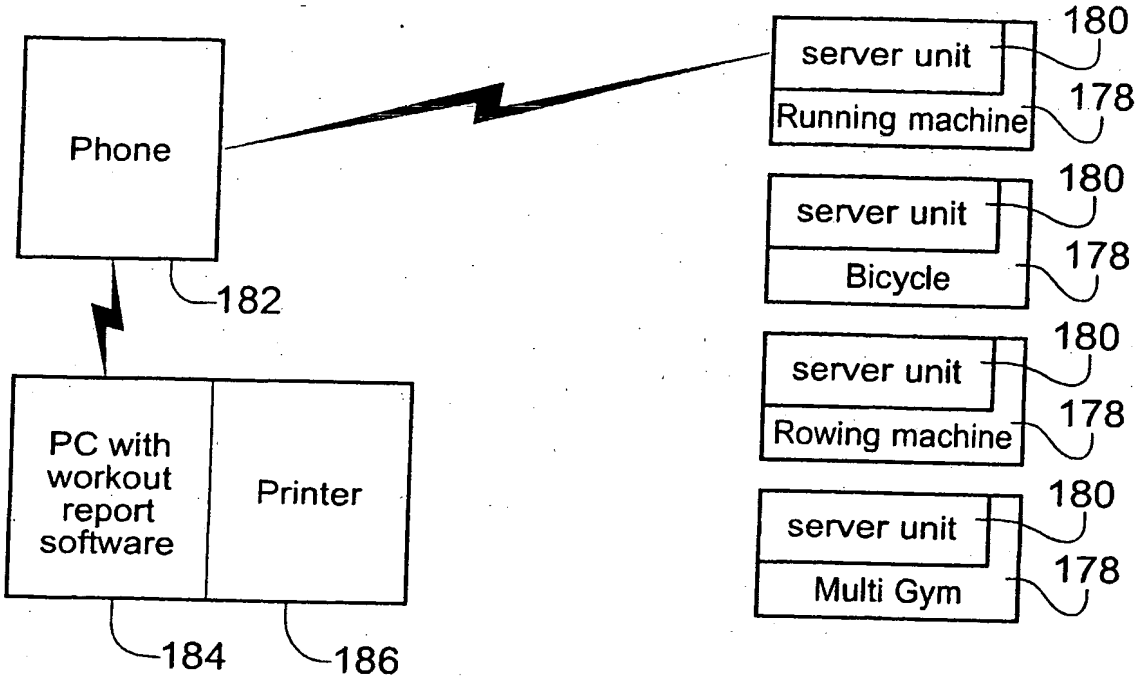

Fig. 13

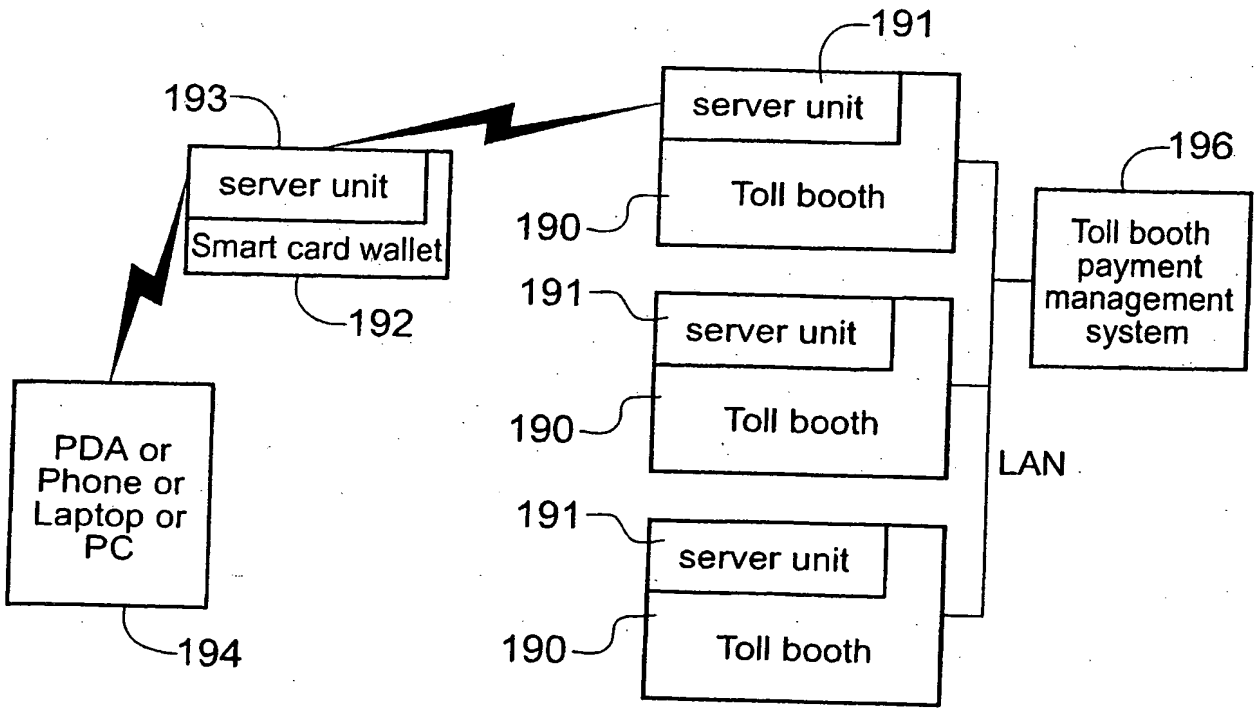

Fig. 14

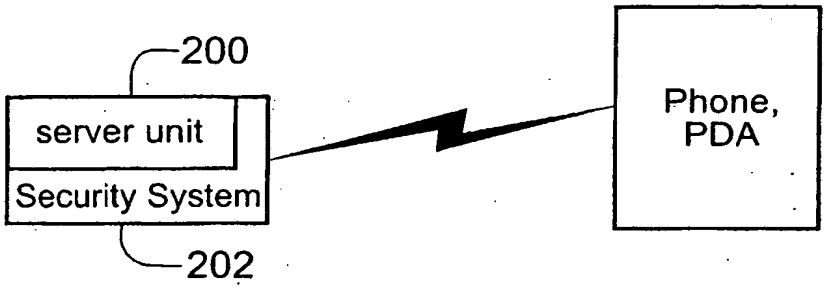

Fig. 15

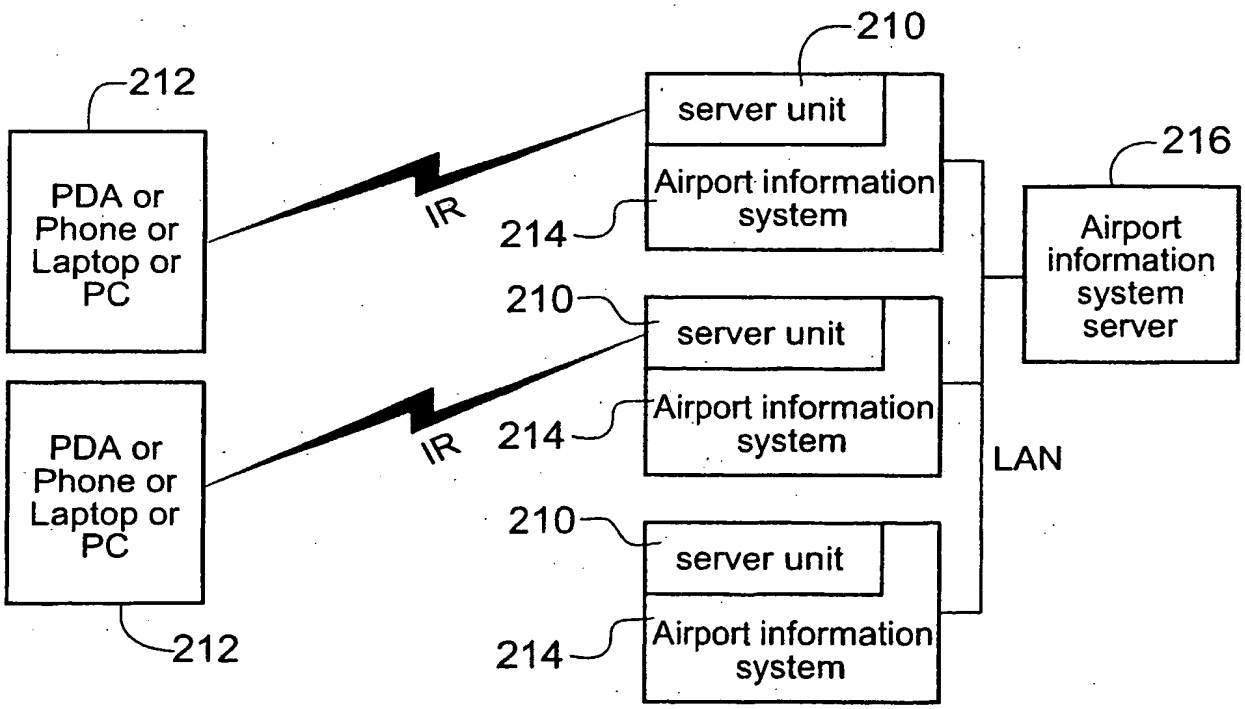

Fig. 16

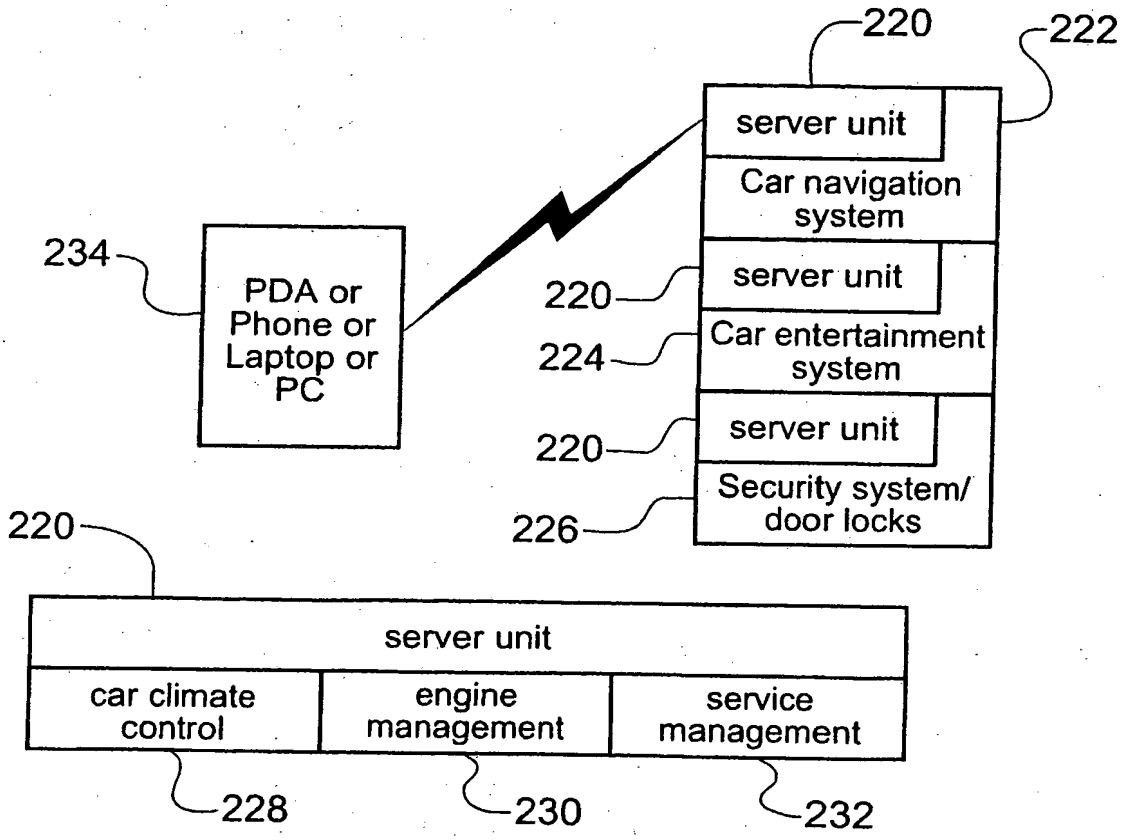

Fig. 17

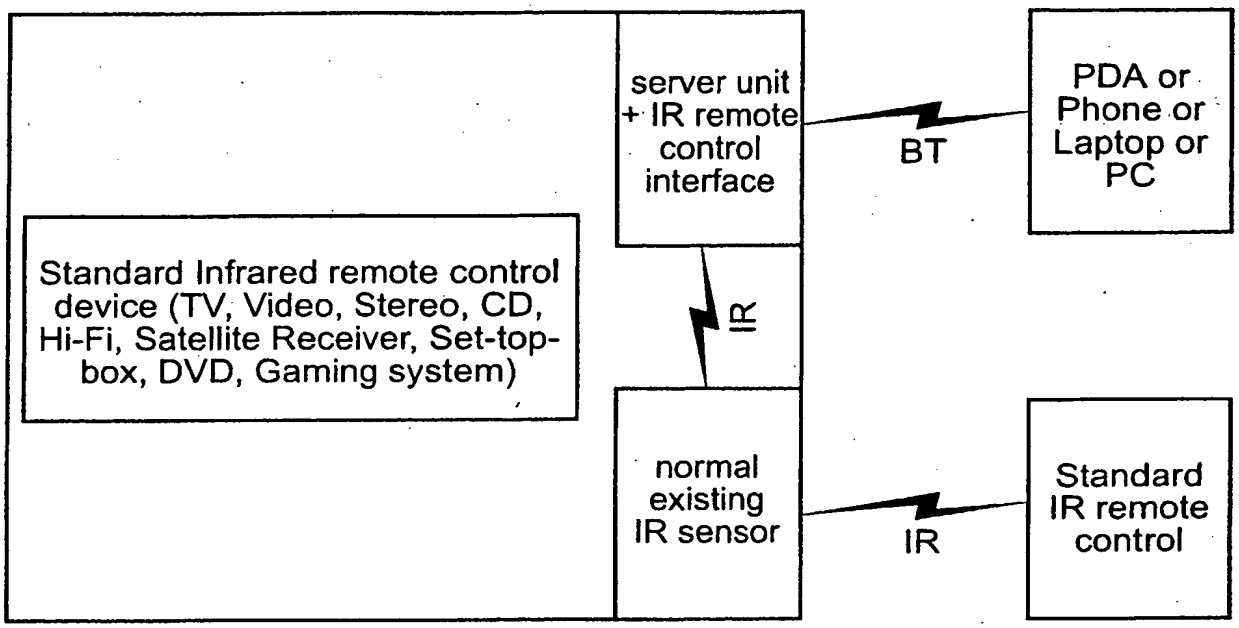

Fig. 18

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 01/00854

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08C17/02 G08C23/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G08C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 838 768 A (HEWLETT PACKARD CO) 29 April 1998 (1998-04-29) page 3, line 14 - line 53 page 4, line 37 -page 5, line 5 ---	1-8, 10-17, 21-24
X	WO 97 18636 A (MIZUNO YOSHIRO ;WEBTRONICS INC (US)) 22 May 1997 (1997-05-22) page 3, line 4 -page 4, line 25 page 5, line 23 -page 7, line 2 ---	1-8, 12-16, 21-24

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search	Date of mailing of the international search report
27 June 2001	03/07/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Pham, P

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 01/00854

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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